6210-08 July 1994

The High-Cost Hospital Medical Staff Proposal in the Health Security Act: Distributional Impacts

W. Pete Welch
Mark E. Miller

The Urban Institute
2100 M Street, N.W.
Washington, DC 20037

Support for this research was provided by the Health Care Financing Administration to The Urban Institute through Cooperative Agreement No. 18-C-90038. This Cooperative Agreement supported a number of research projects related to inhospital physician expenditures. The total budget for all these projects was $646,002 and represents the sole source of funding.

The authors would like to acknowledge Ellen Englert for research assistance and Harvey Meyerson for programming. Any opinions expressed are those of the authors and do not necessarily reflect the opinions of the Health Care Financing Administration, The Urban Institute, or its sponsors.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Proposal

To finance health care reform, the Clinton Administration's Health Security Act (HSA) includes several Medicare savings proposals. One of these proposals (Sec. 4114) would limit payments to physicians in hospitals with high volume of physician services per admission (i.e., high-cost medical staffs).

The high-cost medical staff proposal would measure the volume of physician services in terms of the Relative Value Units (RVUs) used in the Medicare Fee Schedule. A medical staff's collective performance would be defined in terms of "volume per admission"--RVUs per admission adjusted for casemix, teaching status, and disproportionate share status. In a given year, Medicare's payments to physicians on a medical staff could not collectively exceed a limit defined as a certain percentage above the national median.

Physicians providing services in hospitals would bill Medicare as they do now. In 1998, the Health Care Financing Administration (HCFA) would, however, withhold 15 percent of the payment for any physician service delivered in a hospital that had been designated as having a high-cost medical staff. In 1999, HCFA would compare the services actually delivered by a medical staff and the limit. For staffs below the limit in 1998, the entire withhold would be returned. For other staffs, the higher the volume per admission, the less of the withhold would be returned.

This paper simulates the impact of this proposal on medical staffs by the type of hospital and by state. Data from 1991 and 1992 are used for the simulation.

Distributional Impacts

Of all medical staffs, 22.8 percent would be designated as "high cost" and would have a withhold applied to their payments. Under the conservative assumption that physicians would not change their behavior in response to these incentives, only 3.2 percent of all staffs would receive all of their withhold back. The remaining 19.6 percent would receive some or none of their withhold back. To the extent that physicians practice a more conservative style of medicine, they would receive more of their withhold back. As a group, medical staffs would lose 5.5 percent of Medicare payments for inpatient physician services.

As presented in Table 1, this impact varies by hospital type. The percentage reduction in payment would be above average for medical staffs in large urban areas and close to zero for staffs in rural areas. The percentage reduction would be well above average for medical staffs of major teaching hospitals and well below average for staffs of nonteaching hospitals. Medical staffs of hospitals serving a disproportionate share of the poor would experience a slightly greater than average percentage reduction.

There is substantial geographic variation in the impact. Middle Atlantic staffs face a substantially greater percentage reduction in payment than staffs elsewhere. Not surprisingly, the impact varies even more at the state level. As presented in Table 2, staffs in seven states--Connecticut, D.C., Florida, Nevada, New Jersey, New York, and Pennsylvania--would lose at least 8 percent of Medicare payment for inpatient physician services.

Impact of a Prototype Transition Option

When the Prospective Payment System (PPS) was implemented, there was considerable geographic variation in adjusted cost per admission. To mitigate the initial

distributional impact of PPS. Congress enacted a transition. Given this precedent, this paper delineates a prototype transition option. In each region with a median volume per admission that exceeds the national median, staffs would face limits based on a 50-50 blend of the national and regional median. In other regions, staffs would face a limit based only on the national median. A simple schedule might entail the 50-50 blend for a year or two, followed by full implementation.

For illustrative purposes, Tables 3 and 4 show the impact by hospital type and by state of this transition option. The distributional impact of the HSA medical staff proposal would be substantially more equal under this transition option. This is most apparent for the Middle Atlantic hospitals, whose percentage reduction would fall from 10.5 percent to 4.3 percent of payment, close to the new average. For regions with medians below the national median, the impact necessarily remains the same.

Potential for the Shifting of Admissions among Hospitals

This paper also analyzes a second aspect of the policy. A concern raised by some is that physicians might respond to a high-cost medical staff policy by shifting their admissions among hospitals to avoid the withhold. Shifting could threaten the viability of certain hospitals.

To shift admissions in the short run, a physician must be a member of at least two staffs, one of which is designated high-cost and one of which is not. Using the national admissions file, this paper calculated the number of "shiftable" Medicare admissions in each hospital with a high-cost staff.

In the average hospital with a high-cost staff, shiftable Medicare admissions account for 11 percent of all (Medicare and non-Medicare) admissions. Shiftable Medicare admissions also account for the same percent (i.e., 11) of Medicare admissions in all hospitals (i.e., with high-cost staffs and others). These percentages reflect the fact that, on average, physicians admit to only one and a half hospitals. In addition, some physicians have privileges at several hospitals, all of which are high cost.

Concern over the viability of hospitals is greatest for hospitals that serve as the last resort for the inner-city poor. For these hospitals, shiftable admissions represent only 7 percent of total admissions. Hence, such hospitals would be less vulnerable to losing admissions than other hospitals.

I. INTRODUCTION

For several years, the Health Care Financing Administration (HCFA) has funded research exploring options for controlling Medicare physician payments, either by designing payment for "bundles" of physician services or by combining payment for facility and physician services. One thrust of this effort has been research directed toward giving the medical staffs of hospitals incentives to control services provided during inpatient stays.[1] This research developed the policy options, created the technical underpinnings needed for a number of policy options, and explored related issues. This research is reported in both technical reports--a recent one being Welch and Miller (1994)--and refereed journals--Welch (1989), Miller and Welch (1992, 1993b), Welch, et al. (1993), Miller, Welch, and Englert (1994), and Welch, Miller, and Welch (1994).

The Clinton Administration's Health Security Act (HSA) includes a high-cost medical staff policy as one way to generate Medicare savings to help finance health reform. The HSA proposal on high-cost medical staffs draws heavily on the body of research noted above. This paper reports the distributional impact of the HSA proposal. In Sections II and III, this paper describes the proposal and the methods used to simulate the impact. On the assumption that medical staffs do not respond to the incentives, Section IV simulates the distributional impact of the proposal by type of hospital (e.g., teaching status) and by state. Because the proposal would disproportionately reduce payments to medical staffs in the Middle Atlantic region, Section V simulates a simple transitional policy. Finally, Section VI analyzes a related

---

[1]Generally, the terms "hospitals" and "medical staffs" can be used interchangeably, because a hospital cannot function without a medical staff (i.e., its physicians) and a medical staff cannot function with a hospital. It is only when a hospital's physicians act corporately (e.g., reviewing practice patterns) that we use the term "medical staff."

issue--the potential for physicians to shift admissions between hospitals in order to avoid the incentives of the policy.

II. THE PROPOSAL IN THE HEALTH SECURITY ACT

In Section 4114 of its HSA, the Clinton Administration has proposed limiting Medicare payments to physicians in hospitals with physician service volume per admission that is consistently above national norms. In a given year Medicare's payments to the physicians on a medical staff could not exceed 125 percent of the national median for urban hospitals and 140 percent for rural hospitals. Similar limits are already used in other parts of the Medicare program, such as home health agencies, skilled nursing facilities, and rehabilitation and psychiatric hospitals.

The proposal would measure physician services in terms of the Relative Value Units (RVUs) used in the Medicare Fee Schedule (MFS). RVUs per admission directly measures physician service volume and intensity per admission. That is, RVUs per admission varies across medical staffs depending on the number of services and the complexity of services (e.g., an MRI instead of an X-ray). RVUs per admission would be adjusted for differences in patient mix across staffs as well as for teaching status and disproportionate share status, two characteristics that contribute to higher physician services per admission, in part, because these hospitals are thought to handle patients with greater severity of illness. (Disproportionate share hospitals serve a disproportionate share of the poor.) For expositional clarity, we use the term "volume per admission" for casemix-, teaching-, and disproportionate

share-adjusted RVUs per admission. Thus, the proposal would measure the performance of medical staffs in terms of volume per admission.

The HSA would have HCFA calculate the volume per admission for each hospital medical staff in the country. HCFA would then rank the nation's hospitals from highest to lowest volume per admission, and designate "high-cost" medical staffs on the basis of this ranking. Physicians would continue to bill Medicare as they do now. However, HCFA would withhold 15 percent of the payment for any service delivered in hospitals whose medical staff had been designated as high cost. The maximum liability of a physician, in other words, would be 15 percent of his or her Medicare bills for inpatient services delivered as a member of a high-cost medical staff.

Physicians typically provide 90 percent of their inpatient services in a single hospital (Miller, Welch, and Englert, 1994). Physicians on the medical staff of more than one hospital would be treated according to where the services were delivered. For example, a physician might be on two medical staffs--one high-cost, the other not. The 15-percent withhold would apply only to services delivered as part of the high-cost staff. Financial risks are similarly separated for physicians who belong to more than one Independent Practice Association (IPA), a type of Health Maintenance Organization.

Operationally, the HSA high-cost medical staff policy would work as follows: In 1997, HCFA would designate certain medical staffs as high-cost on the basis of 1996 performance. In 1998, HCFA would apply the 15-percent withhold to services delivered (in 1998) in hospitals with high-cost medical staffs. In 1999, HCFA would compare the services actually delivered in 1998 (i.e., the staffs' performance) with the 125 or 140 percent limit, as

appropriate.[2] For staffs below the limit, the entire withhold would be returned with interest. For each staff above the limit, either none or a portion of the 15-percent withhold would be returned, depending on how far above the limit its 1999 volume turned out to be. Withheld amounts would be returned to the medical staff as a whole, which could then decide how to allocate them among its physician members.[3]

Every year the cycle would begin anew. In 1998, for example, HCFA would again designate certain medical staffs to be "high cost," based this time on 1997 performance. In 1999, it would apply the withhold to services delivered in those hospitals in 1999. In 2000, it would compare the actual physician services delivered in 1999 to the limit and return withheld payments as appropriate.

III. METHODS

Section IV presents the simulated impact of the policy by type of hospital and by state. Section VI presents an analysis of the potential for shifting admissions. This section briefly describes the behavioral assumptions and database construction for these analyses.

A. Behavioral Assumptions

It is important to note that the behavioral assumptions differ for the simulation of impacts and the analysis of shifting. In Section IV, the simulation of the proposal's distributional impact on medical staffs assumes no change in the behavior of physicians, even

[2]The limit would be defined in terms of the median hospital in 1996. The legislation would not update this limit for future years.

[3]The staff may request that the Secretary of Health and Human Services return the funds directly to physicians, prorating them according to the physician's services. Note also that beginning in 2000 the limit for urban hospitals would decrease to 120 percent of the national median.

though the thrust of the policy is to create incentives to encourage a more conservative style of practice. A more conservative style would decrease the percentage of medical staffs designated as high cost and increase the withheld amounts returned. Hence, this analysis probably overstates the impact on medical staffs. In principle, physicians could change their style of practice and receive all of their withhold back.

In Section VI, the potential for shifting of Medicare admissions in the short-run is investigated. This potential is calculated assuming that each attending physician would shift admissions from high-cost medical staffs to low-cost medical staffs whenever he or she is a member of both types of staffs. Given that present institutional arrangements probably do not support wholesale shifting of admissions between hospitals, this assumption is also conservative. In sum, the distributional impact analysis assumes no behavioral change, and the admission shifting analysis assumes maximal change given institutions; in each case, the assumption is conservative in the sense of emphasizing potentially extreme features of the policy.

B. Database Construction

Relative Value Units (RVUs) were attached to physician claims (Welch, Verrilli, Meyerson, and Miller, 1994). These claims were linked to hospital admissions using beneficiary identification numbers and dates of service (Miller and Welch, 1993a). The RVUs of these claims were summed for each admission. The RVUs per admission was calculated for each Diagnosis Related Group (DRG), yielding national relative weights. For each hospital, the RVUs and the DRG-based weights were summed. The ratio of a hospital's RVUs and its weights is its casemix-adjusted RVUs per admission.

As is common with Medicare physician data, the work was performed on 5-percent beneficiary files. There is a danger that some of the variation may represent stochasticity at the admission level that would not be present in the 100-percent files used to implement the policy. To overcome this problem, Welch and Miller (1994) estimated volume per admission using a shrinkage estimator, a statistical technique often used in biostatistics (Breslow, 1990). This estimate was then adjusted for teaching and disproportionate share status using adjustors developed in Appendix C.

IV. THE DISTRIBUTIONAL IMPACT

A. Simulation

This section simulates the impact of the Act's proposal by hospital type and by state if payments to high-cost medical staffs were withheld in 1992 (termed the "performance year") based on volume per admission in 1991 (termed the "designation year"). Then in 1993 the withheld amounts would be returned to medical staffs based on their performance in 1992. Although we would like to use two years of post-MFS data, 1992 is the only year of post-MFS data that are available. Thus, we are unable to model the two-year lag between the designation year and the performance year incorporated in the proposal. Rather we use 1991 as the designation year and 1992 as the performance year, and these correspond to 1996 and 1998 in the HSA proposal.[4]

[4]Welch and Miller (1994, Appendix D) found that volume per admission grew at an annualized rate of 1.9 percent between 1989 and 1991. The actual 1991-92 growth rate is inadequate for simulating the impact of the HSA proposal for two reasons: the policy entails a two-year lag between the designated and performance years, and growth in 1991-92 could be heavily influenced by the implementation of the MFS in 1992. Therefore, we assumed that the national average growth rate was 1.9 percent for each of two years. Mechanically, this involved lowering the median instead of increasing each hospital's volume per admission.

Tables 1 and 2 have five numeric columns. The first and second columns, respectively, report the percentage of medical staffs that would be designated as high cost (and subject to the withhold) based on 1991 volume per admission and the percentage of staffs that would ultimately be penalized by not receiving all of their withhold back. The difference between these columns represents the percentage of staffs who would be subject to withholding but would receive all of their withhold back. Nationally, 22.8 percent of staffs would be subject to withholding and 19.6 percent would be penalized. The third column reports the percentage of all payments for 1992 Medicare inpatient physician services that would not be returned to staffs. Nationally, 5.5 percent of payments in 1992 would not be returned. (This figure could serve as a component of an estimate of budget savings from the proposal.) The last two columns report the number of hospitals and admissions in each row category, respectively.

Perhaps the most comprehensive measure of impact is the percentage reduction in payment, because it incorporates the previous two measures: the percentage of staffs that are designated as high cost and the percentage not receiving all of their withholds back. Rural hospitals would be virtually unaffected by this policy, as would small hospitals generally. Government hospitals would face lower-than-average reductions in payment, as would nonteaching hospitals.

It is noteworthy that both disproportionate share and teaching hospitals would experience greater-than-average payment reductions in spite of the adjustment for

---

Mitchell (1993) found much more rapid increase in inpatient physician spending between 1985 and 1988. Deflated-physician charges per admission (during the stay only) grew at an annualized rate of 7.6 percent. Given an annualized increase in casemix index of .5 percent (Welch and Miller, 1994, Appendix D), volume per admission grew at 7.1 percent. Hence, our estimate of volume per admission growth appears conservative.

	Staffs High Cost in 1991 (%)	Staffs Penalized in 1992 (%)	Reduction in Payments to All Staffs (%)
Large Urban	58.5	52.3	8.6
"Last-Resort"	53.0	48.5	6.5

(There were 7,318 admissions in 66 "last-resort" hospitals.)

Although the percentage reduction in payments (6.5 percent) to these last-resort hospitals is above the national mean (5.5 percent), it is substantially lower than the percentage reduction (8.5 percent) for hospitals in large urban areas. Staffs in large urban areas tend to have high volume per admission, and comparing the impact of the policy on last-resort hospitals to the impact on their neighboring hospitals in large urban areas is the more relevant comparison.

Table 2 reports impact by state. A number of states, particularly rural ones, would be unaffected by the policy. Staffs in seven states, on the other hand, would lose at least 8 percent of payment. Those states are Connecticut, D.C., Florida, Nevada, New Jersey, New York, and Pennsylvania. We return to this differential geographic impact in the next section.

B. Volume per Admission by State

This subsection and Appendix A attempt to explain why some states would be penalized more than others under this proposal. This subsection investigates why volume per admission is higher for some states, whereas Appendix A examines the relationship between the volume per admission and payment reduction by decomposing the sources of this impact.

Consider New Jersey, which has the highest volume per admission (155 percent of the median, as presented in Table A-1) and Minnesota, which is one of the larger states with low volume per admission (73 percent of the median). We first look at the states in terms of

overall practice styles by examining physician services per beneficiary across all sites of care (not just inpatient). In terms of age-sex-race-adjusted RVUs per beneficiary, New Jersey is 107 percent of the national mean and Minnesota is 80 percent of this mean (Miller, Holahan, and Welch, 1993). Hence, one explanation for why New Jersey is high-cost for inpatient physician services is that it appears to be high-cost for all physician services, and conversely for Minnesota.

It also is instructive to disaggregate volume per admission by type of service (TOS). For the purposes of profiling physicians, we use 12 TOS categories (Welch, Miller, and Welch, 1994). By state, we calculated observed RVUs to expected RVUs per admission (given the casemix of the state).[6] Whereas in 1992 New Jersey had 72 percent more RVUs than expected for advanced imaging (CT and MRI scans), Minnesota had 17 percent fewer RVUs. For hospital visits, New Jersey had 45 percent more RVUs than expected, whereas Minnesota had 24 percent fewer RVUs. Similar patterns for these two states is observed for most TOS categories (not presented).

A final explanation is that New Jersey hospitals disproportionally have the characteristics that nationally are associated with high volume per admission and Minnesota hospitals do not. Consider the following figures:

	U.S.	New Jersey	Minnesota
government owned	27%	4%	45%
rural	47	0	71
300+ beds	17	56	8

Volume per admission is lower for government hospitals and hospitals in rural areas, and

[6]Because the RVU equivalents of residents' service cannot be disaggregated by TOS, they are not included in these figures.

higher in large hospitals. More so than hospitals nationally, New Jersey hospitals are large, urban, and nongovernment, whereas Minnesota hospitals are small, rural, and government. Hence, hospital characteristics are a partial explanation for the higher volume per admission in New Jersey than in Minnesota.

V. THE IMPACT OF A PROTOTYPE TRANSITION OPTION

Based on Tables 1 and 2, policymakers may judge the distributional impact of the HSA proposal to be too unequal by region or state and wish to modify it. There was considerable geographic variation in adjusted cost per admission when the Prospective Payment System (PPS) was implemented, and there was considerable variation in fees for certain procedures when the MFS was implemented. In both cases, Congress enacted transitions to mitigate the initial distributional impacts. This section delineates a simple transition for the HSA high-cost medical staff proposal and analyzes its distributional impact.

Of these two transition precedents, the more directly relevant one is PPS. Somewhat simplified, the PPS transition involved the blending of hospital-specific, regional, and national rates. As eventually implemented, the federal portion of the payment rate was split between regional and national components as follows: 100-0 in the first year, 75-25 in the second and third years, 50-50 in the fourth and fifth years, and 0-100 thereafter.* In addition, there was a "regional floor" to protect hospitals in high-cost regions.

For the heuristic exercise of simulating a transition, we specify a prototype option. Given that the HSA proposal would define limits in terms of medians, the PPS precedent

*At the same time, the weight of the federal portion relative to the hospital-specific portion increased.

suggests a transition based on a blend of national and regional medians.[3] For instance, a 50-50 blend would be the simple average of the national and regional medians. The product of this blended median and the national percentage limit (e.g., initially 125 percent for urban hospitals) would yield the limit in effect in a given year.

Given that the HSA proposal would be a limit policy (whereas PPS is a payment-rate policy), the limit for a region might be defined in terms of the blended median or the national median, whichever is lower. Without the "whichever-is-lower" provision, hospitals in regions with low volume per admission would be held to a lower limit during the transition than when the policy was fully implemented.

A possible transition schedule might entail a 25-75 blend in the first year, a 50-50 blend in the second year, a 75-25 blend in the third year, and full implementation thereafter. An even simpler schedule might entail a 50-50 blend for a year or two, followed by full implementation. Because simulation in detail would be premature in the absence of a fully-specified legislative proposal, we limit our analysis to the impact of a 50-50 blend.

Simulating such a transition begins with calculating the median by region. As a percentage of the national median, the regional medians are as follows:

New England	105.2
Middle Atlantic	133.2
South Atlantic	108.2
East North Central	101.3
East South Central	90.0
West North Central	73.1

[3]In its simplest form, a transition option probably would not have an analog to the hospital-specific portion of the PPS transition. By way of contrast, if the medical staff limits were set as low as the median, a hospital-specific portion might be deemed necessary to ease the impact on very-high-cost hospitals. However, given that the limit initially would be 125 percent of the median (and higher for rural hospitals), the need for a hospital-specific component is less clear than in the case of PPS.

West South Central	91.6
Mountain	79.3
Pacific	106.1
Puerto Rico	96.6
U.S.	100.0

A region such as the West North Central (73.1 percent of the national median) would not be affected by the transition, because the national median would always apply. A region such as the Middle Atlantic (133.2 percent of the national median) would be affected.

We illustrate the transition using urban hospitals in the Middle Atlantic region:

	Transition	Full Implementation
National Percentage Limit (A)	125%	125%
Regional Adjustor (B)	1.17	1.00
Regional Percentage Limit (A*B)	146%	125%

The regional adjustor for the Middle Atlantic region would be 117 percent (i.e., [.50*133.2%]+[.50*100%]). The limit during the transition would be 146 percent (i.e., 117%*125%) of the national median.

The impact this prototype transition option by hospital type is presented in Table 3, and by state in Table 4. Two impacts are particularly important. First, the reduction in payments to all medical staff would fall from 5.5 percent in a fully-implemented policy to 3.8 percent in a 50-50 transition policy. Thus, budget savings would fall by about one third for the year in which the 50-50 blend was in effect.[9]

Second, the impact by region would be substantially more equal under a 50-50 transition policy. This is most apparent for the Middle Atlantic region, where the reduction in

[9]When they estimated the budget savings for the HSA proposal, the Office of the Actuary and the Congressional Budget Office used 1989-91 hospital-level data. If Tables 1 and 3 were replicated with these earlier data, the reduction in payments would be 4.3 percent. That is, the 50-50 transition would appear to lower budget savings by about 12 percent (i.e., 1 - (3.8/4.3)) relative to current estimates.

payment would fall from 10.5 percent to 4.3 percent, very close to the average. For regions with medians below the national median, the impact necessarily would be unchanged.

As Table 4 shows, the impact of the policy would be softened in the Middle Atlantic states, which have the highest regional median. Payment reductions in New Jersey would fall from 13.6 percent to 7.6, in Pennsylvania from 9.9 to 4.0, and in New York from 9.4 to 2.7. Of these three states, only New Jersey would experience above-average payment reductions when a 50-50 blend was in effect.

VI. THE POTENTIAL SHIFTING OF MEDICARE ADMISSIONS

A. Introduction

A concern raised by some is that physicians might respond to a high-cost medical staff policy by shifting their admissions among hospitals. This shifting could threaten the viability of certain hospitals. Hence, this section analyzes the potential shifting of admissions. (Appendix B describes the construction of the database.)

This analysis pertains to the short run in that it analyzes the potential for shifting admissions given physicians' present affiliation patterns. In the long run, physicians may be able to obtain new affiliations, although their historical admission patterns are unlikely to change immediately (Burns and Wholey, 1992a). However, as argued at the end of this section, in the long run other institutional factors could also change. Therefore, long-run analyses should not consider one institutional change without considering other changes.[10]

[10]The analysis assumes that non-Medicare admissions would not be shifted in the short run, because there is no direct incentive to shift them. There could be an indirect incentive if physicians prefer to have most of their admissions in one hospital. Then physicians might shift Medicare admissions to avoid the high-cost withhold and shift non-Medicare admissions to have most of their admissions in one hospital. However, a preference for

For an admission to potentially shift among hospitals in the short run, two conditions must hold: i) the admitting physician must already be on more than one medical staff, and ii) at least one staff must be high cost and at least one staff not high cost. That is, if a physician has admitting privileges on several medical staffs, none of which are high cost, the policy would not affect his or her practice. Alternatively, if a physician has privileges on several staffs, all of which are high cost, shifting would not enable a physician avoid a penalty.

B. Results

In the average high-cost hospital (that is, a hospital with a high-cost medical staff), shiftable Medicare admissions account for 28 percent of Medicare admissions and 11.0 percent of all admissions (Medicare and non-Medicare). These two figures differ only in terms of their base. A base of total admissions is conceptually more appropriate in investigations of the potential threats to a hospital's overall viability. In addition, shiftable Medicare admissions are 11.1 percent of Medicare admissions to all hospitals. Unlike the previous figure, which is the average ratio across hospitals, this percentage is the ratio of shiftable Medicare admissions and Medicare admissions.

These percentages reflect the fact that, on average, physicians have admitting privileges at about one and a half hospitals and admit 90 percent of their patients to a single hospital (Miller and Welch, 1994). In addition, some physicians have privileges at several hospitals, all of which are high cost.

---

concentrating one's admissions in a single hospital might just as well as result in no shifting of admissions, especially given that Medicare admissions constitute roughly one-third of all admissions.

As noted, on average, 11 percent of the total admissions at high-cost hospitals are shiftable Medicare admissions. The distribution of this percentage is as follows:

percentile	shiftable Medicare admissions/ total admissions (%)
10th	1%
25th	2%
50th	6%
75th	15%
90th	27%

For instance, in 75 percent of high-cost hospitals, shiftable admissions account for no more than 15 percent of all admissions.

This section is motivated by the general concern that the viability of some hospitals might be threatened because of the indirect effects of this policy. The concern is probably greatest as it pertains to hospitals that serve as the last resort for the inner-city poor. Hence, we investigated the potential shifting for government, disproportionate share hospitals in large urban areas. For the average high-cost hospital with these characteristics, shiftable Medicare admissions represent 7 percent of all admissions (versus 11 percent for all high-cost hospitals).

C. Discussion

This section has analyzed the potential to shift admissions among hospitals under a high-cost medical staff policy. It is a short-run analysis in that it takes as given the existing affiliation patterns.

In the long run, the membership, structure, and activities of medical staffs might change in several ways:

- physicians may seek to obtain new affiliations,
- medical staffs may tighten the process by which they give clinical privileges,
- HCFA may give staffs profiling information, and
- medical staff members may work as a group to control excessive volume of physician services per admission.

Although physicians might seek to obtain new affiliations with hospitals, medical staffs are likely to tighten their procedures to avoid giving privileges to physicians who might have high volume per admission. At the same time HCFA could give each medical staff detailed information on its practice style: which types of services are used more than average and which attending physicians appear to use more services than the average. (See Welch, Miller, and Welch [1994].) Finally, members of a staff may work as a group to control the volume of services per admission. If physicians recognize that their collaboration results in withholds often being returned, at least in part, the likely amount of shifting would decrease. In general, analyses should not consider one institutional change--namely, physician's affiliations--without considering other institutional changes.

As noted in Section III, this section makes the conservative assumption that any shiftable admission will be shifted. Implicit in this assumption is that the preferences of patients and characteristics of hospitals are irrelevant: only physician incentives (in a simplified form) are relevant. Empirical work by Burns and Wholey (1992b) suggests otherwise. They analyzed the factors that determine where a patient was admitted. Even when the physician's prior admitting practices were controlled for, other factors had an

impact. In particular, the farther a hospital was from the patient's home (within an urban area), the less likely a patient was to be admitted to that hospital; and medical school affiliation increased the probability of admission. Patient preferences and hospital characteristics are difficult to simulate but could be important.

REFERENCES

Breslow, N. (1990) "Biostatistics and Bayes." Statistical Science 5 (#3): 269-298.

Burns, L. R., and D. R. Wholey (1992a) "Factors Affecting Physician Loyalty and Exit: A Longitudinal Analysis of Physician-Hospital Relationships," Health Services Research 27 (April): 1-24.

_____ (1992b) "The Impact of Physician Characteristics in Conditional Choice Models for Hospital Care," Journal of Health Economics 11 (May): 43-62.

Hausman, J. A. (1978) "Specification Tests in Econometrics." Econometrica 46: 1251-1271.

Miller, M. E., and W. P. Welch (1992) "Physician Charges in the Hospital: Defining Episodes of Care for Controlling Volume Growth." Medical Care 30 (July): 630-645.

-------- (1993a) "Analysis of Hospital Medical Staff Volume Performance Standards: Technical Report," Urban Institute working paper #6210-01. March.

_____ (1993b) "Growth in Medicare Inpatient Physician Charges per Admission, 1986-1989," Inquiry 30 (Fall): 249-259.

_____ (1994) "Medicare Inpatient Physician Charges: An Econometric Analysis Using a National Sample of Admissions," Health Care Financing Review, forthcoming.

Miller, M. E., J. Holahan, and W. P. Welch (1993) "Geographic Variations in Physician Service Utilization and Implications for Health Reform." Urban Institute working paper #2352-01, December.

Miller, M. E., W. P. Welch, and E. Englert (1994) "Physician Hospital Privileges: Implications for a Medical Staff Policy," Inquiry, revisions requested.

Mitchell, J. B. (1993) "Time Trends in Inpatient Physician Spending," Health Services Research 28 (December): 641-660.

Welch, H. G., M. E. Miller, and W. P. Welch (1994) "Physician Profiling: An Analysis of Inpatient Practice Patterns in Florida and Oregon," New England Journal of Medicine 330 (March 3): 607-612.

Welch, W.P. (1989) "Prospective Payment to Medical Staffs: A Proposal," Health Affairs (Spring): 34-49.

Welch, W. P., and M. E. Miller (1994) "Medical Staff Risk Pool Policies: Stability and Simulation," Urban Institute working paper #6210-05.

Welch, W. P., M. E. Miller, H. G. Welch, E. S. Fisher, and J. E. Wennberg (1993) "Geographic Variation in Expenditures for Physician Services in the United States," New England Journal of Medicine 328 (March 4): 621-627.

Welch, W. P., D. Verrilli, H. Meyerson, and M. E. Miller (1994) "Claims-Level File of Physician Services: Database Construction," Urban Institute working paper #6210-07, draft.

Appendix A. DECOMPOSITION OF POLICY IMPACT

Variables: Whereas analyses of the impact of many policies (such as PPS) depend on a single year of data, analyses of the impact of a high-cost medical staff policy depend on each hospital medical staff's performance in two years and the change between the two years. Hence, the source of the impact can be decomposed into two components: the distribution of hospitals in the first year and the hospital-level change between the designation year and the performance year.

To describe the designation-year distribution of hospitals, Table A-1 presents each state's volume per admission (as a ratio of the U.S. median) and the percentage of hospitals in increments above the proposed legislative limit. The mean serves as a measure of the central tendency of the hospitals in a state. The upper tail is the section of the distribution directly affected by the policy.

To investigate the hospital-level change, we calculated relative growth rate. We first normalized volume per admission to 100 separately by year. For instance, a hospital's volume per admission in 1991 was multiplied by 100 and divided by the grand mean (weighted by admissions) in 1991. If a hospital had a normalized volume per admission of 100, its unnormalized volume per admission would equal the grand mean. Then we calculated the relative growth rate as the 1992 normalized volume per admission minus its 1991 analog.

Because the mean (weighted by admissions) of normalized volume per admission is 1.0, the weighted mean of the relative growth rate is necessarily zero. Thus, any change

between 1991 and 1992 is factored out.[11] The mean (relative growth rate) captures the central tendency of the hospital-level relative growth, and standard deviation captures hospital-level year-to-year dispersion.

Results: Table A-1 presents these variables by state. The first four columns yield insights into the percentage of medical staffs that would have been designated as high cost in 1991. Taking California as the largest state, we find that the average medical staff had a volume per admission that was 13 percentage points above the median (i.e., 12 percentage points below the limit). Were all medical staffs at this statewide average, none of staffs would have been designated as high cost. But 34.4 percent were in the upper tail of the distribution as defined by the limit and hence would have been so designated.

We next consider differences in the percentage of medical staffs that were above the limit in 1991 but below it in 1992 and hence would have received all of their withhold back. This percentage is calculated as the difference between the first two columns in Table 2. Virginia and Kentucky have the largest percentages, 13.2 and 6.9, respectively. Table A-1 enables us to investigate three explanations of why some states are above average: i) the more high-cost medical staffs close to (but above) the limit, ii) the slower the state-level growth rate, and iii) the greater the standard deviation of the growth rate, the more high-cost medical staffs will fall below the limit in subsequent years.

In Table A-1, 23.1 percentage of the Virginia medical staffs were above the limit but

[11]This is the variable used to analyze stability in Welch and Miller (1994, p. 4). Its weighted mean necessarily equals zero if the number of admissions for each hospital does not change. The mean in Table A-1 may not be zero because its is not weighted by admissions.

within 10 percentage points of it in 1991, that is, between 125 and 135 percent of the median. Virginia had a slow relative growth rate (4 percentage points below the mean) but its variance (or standard deviation) in growth was at the national average. Much the same can be said for Kentucky except that its high-cost staffs were not so close to the limit. In general, in explaining why some states had a greater proportion of staffs that were designated high-cost but which received all of their withhold back, the distribution of staffs in 1991 and the state-level mean relative growth rate appear to be more useful than the state-level variance in growth rate.[12]

ANOVA: To put hospital-level change into a statistical framework, we performed an analysis of variance (ANOVA) of the relative growth rate. In essence, this is a regression analysis in which each independent variable is a dummy variable for a state. This ANOVA decomposes hospital-level year-to-year variation into between-state variation (i.e., state-level variation) and within-state variation (i.e., remaining hospital-level variation). The R-squared summarizes the effect of states on the hospital-level change.[13]

The ANOVA of the relative growth rate had an R-squared of .07, indicating that states explained only 7 percent of the variation in relative growth. Dividing variation by its degrees of freedom yields variance (or average variation). The variance of relative growth rate is 9.5

[12]One should not extrapolate the 1991-92 growth rate to 1992-93. The year-to-year variance in growth rates (not levels) is sufficiently large at the state level that high-growth years are often followed by low-growth years. (See Welch and Miller [1994], Appendix A.)

[13]If this ANOVA is modified to allow the variance of the error term to differ by state, the model becomes a special case of an error components model. In principle, this special case would yield the mean and standard deviation of the relative growth rate by state, as in Table A-1. However, it is simpler to directly calculate the mean and standard deviation.

squared (see Table A-1, U.S.), which can be approximately decomposed into the state-level variance of 2.6 squared and hospital-level variance of 9.1 squared.[14] The standard deviation of 2.6 summarizes the between-state variance in mean growth (the next-to-the-last column in Table A-1). This result suggests that radical shifts in volume per admission (the level, not the growth rate) are not common at the state level.

There are, however, examples of sizeable shifts: Alaska and Hawaii had mean relative growth rates of 12 and 14 percentage points, respectively. These larger shifts could easily be due to aspects of the MFS that we were unable to adjust for (e.g., the global surgical period). A simulation based on two years of data under the MFS would be highly advisable.

Both components of variance--the hospital-level variance of 9.1 squared and state-level variance of 2.6 squared--may be overstated for policy purposes. Previous work with 100-percent data showed substantially lower hospital-level variance.[15] Because any policy would presumably utilize 100-percent data, hospital-level volume per admission would be more stable under an implemented policy.

Relevant to state-level variance, future changes in MFS payment rules are less likely to have differential impacts by state than past changes. Global surgical periods, for example, presumably increased the surgical periods more in states with short periods than in other states. Under the MFS, each state would start at approximately the same place in terms of price and payment rules and would move in the same direction, so that the impact on

---

[14]Given the approximation inherent in decomposing variance (as distinct from variation), $9.5^2 = 2.6^2 + 9.1^2$. The R-square of .07 (i.e., $2.6^2/9.5^2$) is significant at 1 percent.

[15]Using 100-percent data for seven states, Welch and Miller (1994) estimated a standard deviation of 6.3 percent for the relative growth rate, which is two-thirds of the 9.5 estimated here. We suspect that the difference is the effect of the shrinkage estimator.

measured service use is likely to be roughly the same size in each state. Hence, state-level variance due to changes in policy and claims-processing procedures is likely to be less in the future than in the recent past. Thus, state-level volume per admission might be more stable than these data suggest.

Appendix B. CONSTRUCTION OF SHIFTING-ADMISSION DATABASE

As with the analysis of distributional impacts, this analysis assumes that medical staffs would have been designated as high cost based on performance in 1991 and withholds would have been applied in 1992. Hence, we consider the potential for shifting in 1992.

We used the 100% MedPAR for 1992. This file is ideal for analyzing potential shifting, because it is national in scope. Admissions were dropped from the MedPAR file if one of the following conditions held: i) the admission was not paid for under PPS (except for Maryland hospitals) and ii) the admission was paid for by an HMO.

From the MedPAR file, we extracted several variables, the most important to this analysis being the hospital identification number (ID) and the Unique Physician Identification Number (UPIN) of the attending physician. Admission counts were summed by hospital and by attending physician, yielding a file in which the physician-hospital combination was the unit of analysis. Hence, a physician who admitted patients to two hospitals was represented as two records in this file.[16] This file had 10,029,000 admissions (rounded), 5,362 hospitals, 255,653 physicians, and precisely 400,000 physician-hospital combinations.

Under a medical staff policy, certain medical staffs would have been designated as "high cost." As part of our impact analysis in Section IV, we attached a high-cost variable to each record, which represents a physician-hospital combination. This variable took the value of one if the medical staff would have been designated high cost and zero otherwise. Several

[16]This file was merged with the UPIN Master File, which has such variables as physician specialty. Records with UPINs not in the UPIN Master File were dropped (they comprised about 10 percent of the UPINs but only 4 percent of the admissions). The dropped records included surrogate UPINs used to represent multiple physicians (i.e., OTH000, RES000, and PHS000). Physicians who were outliers in terms of number of affiliations (ten or more) were also dropped (N=28).

other hospital-level variables (e.g., disproportionate share status) were also attached. In particular, we added the total number of admissions (Medicare and non-Medicare). This variable, which came from HCRIS file, was total hospital admissions exclusive of admissions to swing beds. In our database, Medicare admissions were 36% of all admissions.

The high-cost variable was averaged for each physician across hospitals, and this average was attached to each of his or her records. As noted, a physician who admits to several hospitals is represented in this file as several records. The interpretation of this average high-cost variable is straightforward: An average of 1 indicates that the physician admits only to high-cost hospitals. (As a shorthand, we refer to hospitals with high-cost staffs as "high-cost hospitals" and other hospitals as "non-high-cost hospitals.") Suppose that, for a given physician-hospital combination, the high-cost variable was 1 but the average high-cost variable was less than 1. This would indicate that the physician admits to at least one non-high-cost hospital, even though the record itself pertains to a high-cost hospital.

For each physician-hospital combination, we created a variable to measure the number of Medicare admissions that were shiftable. A "shiftable admissions variable" was set equal to the number of Medicare admissions of that physician to that hospital if the hospital was high-cost and if the average high-cost variable was less than 1; otherwise, it was set equal to 0.

We wished to determine how many of a high-cost hospital's admissions could be shifted by the attending physician to non-high-cost hospitals. For each hospital, the shiftable admissions variable was summed across its physicians, yielding a hospital-level file.

Because the shiftable admissions of high-cost hospitals are the concern here, the unit of analysis was the high-cost hospital. For each high-cost hospital, we calculated the ratio of the shiftable Medicare admissions and all Medicare admissions. We also calculated the ratio of the shiftable Medicare admissions and total admissions. For each ratio, the average across hospitals was calculated.[17]

[17] We and other analysts sometimes calculate averages across hospitals by weighting by the number of each hospital's admissions. Because here we are interested in the typical hospital, these averages are not weighted; that is, each hospital has an equal weight.

Appendix C. HOSPITAL-LEVEL ADJUSTMENTS

PPS Precedents: Under PPS, teaching and disproportionate share hospitals are paid more than other hospitals, because these types of hospitals have higher costs. Teaching hospitals receive direct medical education payments to cover the stipends of interns and residents. They also receive indirect medical education payments, in part, because of the perceived greater severity of illness of their patients.

Building on the PPS precedent, the Administration's proposal would allow the medical staffs of teaching and disproportionate share hospitals to have higher volume per admission without being designated as "high cost." The proposal would direct the Secretary of Health and Human Services to make such adjustments for these factors, but it does not specify a methodology or an adjustment formula. This appendix discusses a possible methodology that was developed in Miller and Welch (1993).

It should be kept in mind that adjusting a medical staff's volume per admission affects not only that staff's volume per admission but also the median. Hence, any adjustment potentially changes the impact of a policy on each staff.

Teaching Hospitals: Adjusting for teaching status interacts with another issue: how to impute the physician services delivered by interns and residents (who we will usually refer to as "residents"). For most physician services, Medicare pays on a fee-for-service (FFS) basis. In teaching hospitals, residents deliver many of the physician services but are not paid on a FFS basis; rather their stipends are financed, in part, through Medicare Part A.

There are at least two approaches to handling the services delivered by residents. First, volume per admission could be computed without those services. Then a regression-derived teaching adjustment would adjust for the exclusion of these physician services as well as factors such as any differential in severity of illness. Second, the RVUs of residents could be imputed and added to FFS-based RVUs. A teaching adjustment (derived from another regression) would be applied to this sum.

Each approach has its advantages. Excluding the services of residents has the advantage of technical simplicity: one would not need to impute the RVUs of residents. However, empirical work shows that the teaching adjustment would be negative (and sizeable). This would be superficially inconsistent with the positive adjustment in PPS, in which the higher costs of teaching hospitals require a positive adjustment. A negative adjustment for inpatient physician services could be counter-intuitive to them. The alternative approach--imputing the services of residents--yields a pattern that on its face is consistent with PPS, but the imputation of residents' RVUs is not straightforward. The Administration's proposal embodies the second approach.

Our method of imputing the RVUs of residents involves indirect payment for residents under Part A. Suppose these expenditures were shifted to Part B, where they would be conceptually more appropriate as physician services. If a medical staff's performance was defined in terms of expenditures (as national volume performance standards are defined), then the FFS-based expenditures could be added to the expenditures of residents. The Administration's proposal, however, is in terms of RVUs, which are a more direct measure of volume and intensity. Expenditures of residents could simply be converted from dollars into RVUs.

To calculate residents' volume per admission, we first took the national average salary (plus benefits) of residents and divided it by the MFS conversion factor, yielding about 1,900 RVUs per resident.[18] For each hospital, this national figure was used to calculate casemix-adjusted RVUs per admission attributed to residents,[19] which was added to the FFS-based volume per admission. The sum (total volume per admission) captures services delivered by all physicians and is the basis of the next step of the analysis.

Disproportionate Share Hospitals: Under PPS, hospitals that serve a disproportionate share of the poor are paid more than other hospitals, other things being equal. A rationale for this is that the poor have a greater severity of illness. Because severity of illness is not measured by casemix (by definition), a hospital-level adjustment might be advisable.

Given that the PPS adjustment for teaching and disproportionate share status drew upon regression analyses, we regressed total volume per admission on these and other variables (e.g., the number of beds). Both teaching and disproportionate share status were defined as they are for PPS purposes.

Results: Table C-1 presents the regression results with 1992 data. The teaching coefficient is .433; that is, a 10-percentage point increase in the intern-and-residents-to-beds (IBR) ratio is

[18]Using audited data from BPO, we calculated an average of $44,746 per resident in 1985. Consistent with the law, we updated this amount to the relevant years using the CPI-U, yielding $58,344 in 1992.

[19]More precisely, for each hospital, the number of residents was multiplied by the national figure of about $1,900 RVUs per resident. This was divided by the number of admissions (Medicare and non-Medicare) to that hospital, yielding RVUs per admission. Finally, this figure was divided by the physician casemix index, yielding the casemix-adjusted RVUs per admission that are attributed to residents.

associated with about 4.33 percent increase in casemix-adjusted RVUs per admission. This is about half of the magnitude of the PPS teaching adjustment of 7.7 percent. In Table C-1, the disproportionate share coefficient is .018.[20]

The Issue of Simultaneity: Given that the IRB ratio is an independent variable, the definition of our dependent variable raises the methodological issue of whether the teaching variable is truly exogenous to the equation. One component of the dependent variable is the per-admission RVUs of residents. This component is k * IR/admissions, where IR is the number of the hospital's residents, "admissions" is its Medicare plus non-Medicare admissions, and k is a national constant of about 1.900 RVUs per resident. (Later this component is divided by the casemix index and added to the FFS-based casemix-adjusted RVUs per admission.)

The above definition can be rearranged as k * (IR/bed)/(admissions/bed). That is, the residents' RVUs are a constant times the IRB ratio (IR/bed) divided by a component of the occupancy rate (admissions/bed). Hence, the IRB ratio is both an independent variable and a component of the dependent variable, so that ordinary least squares (OLS) may not be inappropriate.

A widely-used solution to this problem is two-stage least squares (2SLS). The first stage constructs an instrument that resembles the IRB ratio but is uncorrelated with the error term. To estimate the instrument in the first stage, it is common to use the other independent variables (e.g., bed size, urban/rural location) to predict the variable of interest. We also included the composition of the medical staff (i.e., percentages of surgical specialists, of

[20]Presumably, like casemix adjustment in PPS, the teaching and disproportionate share adjustments promulgated in regulation would reflect HCFA's analysis of the most current data.

medical specialists, and of radiologists, anesthesiologists, and pathologists; the excluded category was percentage of general and family practitioners). In the second stage, the instrument is substituted for the original variable and least squares is applied. The Hausman test (Hausman, 1978) is applied to the OLS and 2SLS estimates to determine whether they are statistically different from one another.

Table C-1 compares the OLS and 2SLS results of our model. There is little difference in the estimated teaching coefficients (OLS, .433; 2SLS, .476). The Hausman test (t=.64) indicates that there is no statistical difference between the OLS and 2SLS IR coefficients. We conclude the OLS estimate of teaching activity (b=.433) can serve as the technical basis of a policy decision.

Table 1
Impact of the HSA
High-Cost Medical Staff Proposal
by Hospital Type[1]

Hospital Type	% of All Medical Staffs Staffs High-Cost in 1991	% of All Medical Staffs Staffs Penalized in 1992	Reduction in Payments to All Staffs[2] (%)	Database Number of Hospitals	Database Number of Admissions in 1992
U.S.	22.8	19.6	5.5	4,901	463,088
Control					
Private Nonprofit	28.1	24.6	5.8	2,918	348,702
Government	7.6	6.1	2.8	1,322	65,041
For-Profit	29.7	25.0	5.6	661	49,345
Disproportionate Share Status					
No	16.9	14.8	5.1	3,600	296,480
Yes	39.0	33.2	6.1	1,301	166,608
Urban/Rural Location					
Rural	0.3	0.3	0.3	2,296	100,281
Other Urban	29.5	23.9	4.4	1,433	196,771
Large Urban	58.5	52.3	8.6	1,172	166,036
Bedsize					
<50	0.7	0.5	0.1	1,067	15,994
51-100	4.2	3.2	0.8	1,203	45,892
101-200	22.5	18.2	2.8	1,123	93,204
201-300	43.9	37.6	4.9	675	101,415
301-500	58.4	52.0	6.5	610	131,634
500+	69.1	65.0	8.5	223	74,949
Teaching					
Nonteaching	13.9	11.1	3.7	3,796	256,630
Minor Teaching	50.9	46.0	6.5	897	163,433
Major Teaching	64.4	62.5	9.6	208	43,025
Region					
New England	15.0	14.1	2.9	213	26,248
Middle Atlantic	61.7	58.1	10.5	504	79,655
South Atlantic	28.7	24.9	5.3	746	88,366
East North Central	23.9	20.7	5.1	773	83,134
East South Central	13.3	9.5	3.4	430	38,691
West North Central	7.2	6.2	3.1	666	34,883
West South Central	16.8	12.2	3.9	686	48,780
Mountain	8.8	6.5	3.3	308	17,990
Pacific	23.7	20.0	4.1	539	42,367
Puerto Rico	0.0	0.0	0.0	36	2,974

[1] This policy would designate medical staffs with volume per admission above 125% of the national median (140% for rural hospitals) to be high cost. Fifteen percent of payments to members of these staffs would be withheld. Casemix, teaching status, and disproportionate share status would be adjusted for, as they are here.

[2] This figure is calculated as the withheld amounts not returned (summed over hospitals in a category) as a ratio of the payment that would otherwise have been made to physicians in those hospitals.

Table 2
Impact of the HSA
High-Cost Medical Staff Proposal
by State[1]

State	% of All Medical Staffs		Reduction in Payments to All Staffs[2] (%)	Database	
	Staffs High-Cost in 1991	Staffs Penalized in 1992		Number of Hospitals	Number of Admissions in 1992
U.S.	22.8	19.6	5.5	4,901	463,088
Alabama	16.0	12.3	4.0	106	10,173
Alaska	0.0	0.0	0.0	11	290
Arizona	29.6	22.2	5.7	54	5,260
Arkansas	6.2	1.2	0.1	81	6,640
California	34.4	29.0	5.5	369	30,496
Colorado	5.1	5.1	0.9	59	3,823
Connecticut	68.8	62.5	8.4	32	5,476
Delaware	50.0	50.0	5.5	6	1,153
District of Columbia	77.8	77.8	10.4	9	1,543
Florida	56.4	52.5	8.7	204	29,580
Georgia	15.5	12.9	3.8	155	13,385
Hawaii	0.0	0.0	0.0	15	896
Idaho	0.0	0.0	0.0	33	1,467
Illinois	33.8	27.3	6.4	198	21,612
Indiana	8.3	7.3	2.0	109	10,933
Iowa	3.6	3.6	1.2	111	5,895
Kansas	6.6	4.9	4.1	122	5,008
Kentucky	16.8	9.9	1.9	101	9,121
Louisiana	18.0	11.5	1.9	122	9,093
Maine	0.0	0.0	0.0	38	2,863
Maryland[3]	30.6	30.6	3.3	49	8,777
Massachusetts	10.0	10.0	1.7	90	12,830
Michigan	29.7	26.7	6.5	165	17,036
Minnesota	4.5	3.0	3.6	133	6,217
Mississippi	3.1	2.1	1.0	97	6,467
Missouri	16.7	14.3	3.9	126	11,482
Montana	0.0	0.0	0.0	46	1,669
Nebraska	9.6	9.6	3.1	83	2,979
Nevada	30.0	25.0	10.4	20	1,694
New Hampshire	0.0	0.0	0.0	26	1,837
New Jersey	95.3	95.3	13.6	85	16,152
New Mexico	6.1	0.0	0.0	33	1,816
New York	46.0	44.1	9.4	213	30,707
North Carolina	13.7	11.1	2.9	117	12,563
North Dakota	0.0	0.0	0.0	41	1,545

Table 2 (con't)
Impact of the HSA
High-Cost Medical Staff Proposal
by State[1]

State	% of All Medical Staffs: Staffs High-Cost in 1991	% of All Medical Staffs: Staffs Penalized in 1992	Reduction in Payments to All Staffs[2] (%)	Database: Number of Hospitals	Database: Number of Admissions in 1992
Ohio	27.4	24.6	4.6	179	23,474
Oklahoma	7.4	4.6	2.0	108	6,891
Oregon	0.0	0.0	0.0	62	4,048
Pennsylvania	64.1	57.3	9.9	206	32,796
Puerto Rico	0.0	0.0	0.0	36	2,974
Rhode Island	8.3	8.3	0.5	12	2,395
South Carolina	6.6	4.9	1.4	61	5,635
South Dakota	2.0	2.0	2.1	50	1,757
Tennessee	15.9	12.7	4.8	126	12,930
Texas	21.3	17.1	5.6	375	26,156
Utah	0.0	0.0	0.0	37	1,675
Vermont	0.0	0.0	0.0	15	847
Virginia	30.8	17.6	2.4	91	10,882
Washington	1.2	1.2	0.0	82	6,637
West Virginia	3.7	3.7	1.1	54	4,848
Wisconsin	9.0	8.2	4.3	122	10,079
Wyoming	0.0	0.0	0.0	26	586

[1] This policy would designate medical staffs with volume per admission above 125% of the national median (140% for rural hospitals) to be high cost. Fifteen percent of payments to members of these staffs would be withheld. Casemix, teaching status, and disproportionate share status would be adjusted for, as they are here.

[2] This figure is calculated as the withheld amounts not returned (summed over hospitals in a category) as a ratio of the payment that would otherwise have been made to physicians in those hospitals.

[3] Because data for Maryland hospitals were unavailable for 1991, we assumed that volume per admission in each Maryland hospital grew at the national rate.

Table 3
Impact of a 50-50 Transition for the HSA
High-Cost Medical Staff Proposal
by Hospital Type[1]

Hospital Type	% of All Medical Staffs		Reduction in Payments to All Staffs[2] (%)	Database	
	Staffs High-Cost in 1991	Staffs Penalized in 1992		Number of Hospitals	Number of Admissions in 1992
U.S.	18.0	14.7	3.8	4,901	463,088
Control					
Private Nonprofit	21.5	17.9	3.9	2,918	348,702
Government	6.1	4.8	2.1	1,322	65,041
For-Profit	26.0	20.4	4.6	661	49,345
Disproportionate Share Status					
No	13.3	11.0	3.6	3,600	296,480
Yes	31.1	25.1	4.1	1,301	166,608
Urban/Rural Location					
Rural	0.2	0.2	0.2	2,296	100,281
Other Urban	24.0	18.1	3.1	1,433	196,771
Large Urban	45.5	39.1	5.8	1,172	166,036
Bedsize					
<50	0.5	0.4	0.1	1,067	15,994
51-100	3.3	2.3	0.5	1,203	45,892
101-200	17.5	13.0	1.6	1,123	93,204
201-300	33.6	28.0	3.3	675	101,415
301-500	47.9	40.0	4.3	610	131,634
500+	53.8	49.8	6.4	223	74,949
Teaching					
Nonteaching	11.0	8.2	2.5	3,796	256,630
Minor Teaching	40.1	34.9	4.6	897	163,433
Major Teaching	49.0	47.1	6.3	208	43,025
Region					
New England	10.8	9.4	1.8	213	26,248
Middle Atlantic	31.9	28.6	4.3	504	79,655
South Atlantic	23.3	19.2	3.6	746	88,366
East North Central	23.2	20.1	4.9	773	83,134
East South Central	13.3	9.5	3.4	430	38,691
West North Central	7.2	6.2	3.1	666	34,883
West South Central	16.8	12.2	3.9	686	48,780
Mountain	8.8	6.5	3.3	308	17,990
Pacific	18.0	13.7	3.0	539	42,367
Puerto Rico	0.0	0.0	0.0	36	2,974

[1] The fully-implemented policy would designate medical staffs with volume per admission above 125% of the national median (140% for rural hospitals) to be high cost. Fifteen percent of payments to members of these staffs would be withheld. Casemix, teaching status, and disproportionate share status would be adjusted for, as they are here.

[2] This figure is calculated as the withheld amounts not returned (summed over hospitals in a category) as a ratio of the payment that would otherwise have been made to physicians in those hospitals.

Table 4
Impact of a 50-50 Transition for the HSA
High-Cost Medical Staff Proposal
by State[1]

State	% of All Medical Staffs: Staffs High-Cost in 1991	% of All Medical Staffs: Staffs Penalized in 1992	Reduction in Payments to All Staffs[2] (%)	Database: Number of Hospitals	Database: Number of Admissions in 1992
U.S.	18.0	14.7	3.8	4,901	463,088
Alabama	16.0	12.3	4.0	106	10,173
Alaska	0.0	0.0	0.0	11	290
Arizona	29.6	22.2	5.7	54	5,260
Arkansas	6.2	1.2	0.1	81	6,640
California	26.0	20.1	4.0	369	30,496
Colorado	5.1	5.1	0.9	59	3,823
Connecticut	59.4	50.0	5.9	32	5,476
Delaware	50.0	33.3	2.6	6	1,153
District of Columbia	77.8	77.8	7.5	9	1,543
Florida	48.5	44.1	6.6	204	29,580
Georgia	11.6	6.5	2.1	155	13,385
Hawaii	0.0	0.0	0.0	15	896
Idaho	0.0	0.0	0.0	33	1,467
Illinois	33.3	26.8	6.1	198	21,612
Indiana	7.3	7.3	1.9	109	10,933
Iowa	3.6	3.6	1.2	111	5,895
Kansas	6.6	4.9	4.1	122	5,008
Kentucky	16.8	9.9	1.9	101	9,121
Louisiana	18.0	11.5	1.9	122	9,093
Maine	0.0	0.0	0.0	38	2,863
Maryland[3]	22.4	22.4	2.0	49	8,777
Massachusetts	4.4	4.4	0.8	90	12,830
Michigan	29.7	26.7	6.3	165	17,036
Minnesota	4.5	3.0	3.6	133	6,217
Mississippi	3.1	2.1	1.0	97	6,467
Missouri	16.7	14.3	3.9	126	11,482
Montana	0.0	0.0	0.0	46	1,669
Nebraska	9.6	9.6	3.1	83	2,979
Nevada	30.0	25.0	10.4	20	1,694
New Hampshire	0.0	0.0	0.0	26	1,837
New Jersey	74.1	67.1	7.6	85	16,152
New Mexico	6.1	0.0	0.0	33	1,816
New York	15.0	14.1	2.7	213	30,707
North Carolina	10.3	6.8	1.4	117	12,563
North Dakota	0.0	0.0	0.0	41	1,545

Table 4 (con't)
Impact of a 50-50 Transition for the HSA
High-Cost Medical Staff Proposal
by State[1]

State	% of All Medical Staffs		Reduction in Payments to All Staffs[2] (%)	Database	
	Staffs High-Cost in 1991	Staffs Penalized in 1992		Number of Hospitals	Number of Admissions in 1992
Ohio	25.1	22.3	4.2	179	23,474
Oklahoma	7.4	4.6	2.0	108	6,891
Oregon	0.0	0.0	0.0	62	4,048
Pennsylvania	32.0	27.7	4.0	206	32,796
Puerto Rico	0.0	0.0	0.0	36	2,974
Rhode Island	0.0	0.0	0.0	12	2,395
South Carolina	3.3	3.3	0.5	61	5,635
South Dakota	2.0	2.0	2.1	50	1,757
Tennessee	15.9	12.7	4.8	126	12,930
Texas	21.3	17.1	5.6	375	26,156
Utah	0.0	0.0	0.0	37	1,675
Vermont	0.0	0.0	0.0	15	847
Virginia	22.0	12.1	1.1	91	10,882
Washington	1.2	0.0	0.0	82	6,637
West Virginia	3.7	3.7	0.8	54	4,848
Wisconsin	9.0	8.2	4.2	122	10,079
Wyoming	0.0	0.0	0.0	26	586

[1] The fully-implemented policy would designate medical staffs with volume per admission above 125% of the national median (140% for rural hospitals) to be high cost. Fifteen percent of payments to members of these staffs would be withheld. Casemix, teaching status, and disproportionate share status would be adjusted for, as they are here.

[2] This figure is calculated as the withheld amounts not returned (summed over hospitals in a category) as a ratio of the payment that would otherwise have been made to physicians in those hospitals.

[3] Because data for Maryland hospitals were unavailable for 1991, we assumed that volume per admission in each Maryland hospital grew at the national rate.

Table A-1
Decomposition of the Impact
of the HSA Proposal
by State[1]

State	Volume per Admission in 1991 (as a % of the national median)[2]	Percentage of Medical Staffs in 1991			Relative Growth Rate in 1991-92	
		125-130%	130-135%	135+ %	Mean	Standard Deviation
U.S.[3]	100.4	4.7	5.3	13.3	-0.1	9.5
Alabama	96.2	5.7	5.7	4.7	0.1	9.1
Alaska	65.5	0.0	0.0	0.0	12.4	8.4
Arizona	107.2	9.3	7.4	13.0	-2.8	8.0
Arkansas	86.7	3.7	2.5	1.2	-3.8	8.4
California	113.0	9.2	7.6	17.6	1.1	10.3
Colorado	89.3	3.4	0.0	1.7	0.6	7.3
Connecticut	130.3	15.6	21.9	31.3	-1.8	9.7
Delaware	127.5	0.0	16.7	33.3	-7.1	12.3
District of Columbia	142.5	0.0	0.0	77.8	-8.1	5.5
Florida	126.0	6.9	7.8	42.6	-0.3	10.3
Georgia	91.4	3.9	3.9	7.7	0.8	9.9
Hawaii	80.7	0.0	0.0	0.0	14.0	8.7
Idaho	73.1	0.0	0.0	0.0	0.8	8.0
Illinois	108.4	4.5	8.6	20.7	-2.7	9.8
Indiana	91.5	3.7	1.8	3.7	1.4	7.7
Iowa	78.6	1.8	0.0	1.8	0.5	8.1
Kansas	77.9	2.5	3.3	0.8	0.3	9.4
Kentucky	97.5	2.0	7.9	10.9	-3.6	9.7
Louisiana	97.6	4.9	5.7	7.4	-2.5	8.7
Maine	90.8	0.0	0.0	0.0	3.2	8.2
Maryland	118.5	8.2	8.2	14.3	0.0	0.0
Massachusetts	108.4	5.6	1.1	3.3	4.1	8.0
Michigan	108.2	3.0	5.5	21.2	0.0	9.7
Minnesota	72.6	2.3	0.8	1.5	1.8	8.5
Mississippi	81.7	4.1	0.0	0.0	0.5	10.0
Missouri	99.3	5.6	5.6	6.3	-0.7	9.3
Montana	62.7	0.0	0.0	0.0	6.7	8.3
Nebraska	78.2	2.4	0.0	7.2	-2.8	8.7
Nevada	97.5	10.0	5.0	15.0	0.1	7.7
New Hampshire	92.2	0.0	0.0	0.0	-0.8	8.6
New Jersey	154.9	2.4	3.5	89.4	-1.4	12.0
New Mexico	89.3	6.1	0.0	0.0	-4.4	10.3
New York	122.6	6.1	12.2	28.2	4.8	9.8
North Carolina	97.6	3.4	6.0	4.3	-0.3	9.0
North Dakota	68.3	0.0	0.0	0.0	0.0	7.4

Table A-1 (con't)
Decomposition of the Impact
of the HSA Proposal
by State

State	Volume per Admission in 1991 (as a % of the national median)	Percentage of Medical Staffs in 1991			Relative Growth Rate in 1991-92	
		125-130%	130-135%	135+ %	Mean	Standard Deviation
Ohio	108.3	7.3	10.1	10.1	-0.8	8.0
Oklahoma	82.5	0.9	3.7	2.8	0.3	8.5
Oregon	83.7	0.0	0.0	0.0	1.4	7.1
Pennsylvania	133.2	8.7	9.7	48.5	-2.0	9.6
Puerto Rico	91.8	0.0	0.0	0.0	7.0	10.2
Rhode Island	111.2	8.3	0.0	0.0	5.3	8.8
South Carolina	92.3	3.3	3.3	0.0	1.9	8.2
South Dakota	66.7	2.0	0.0	0.0	-1.6	7.3
Tennessee	94.5	3.2	7.9	4.8	-1.1	9.9
Texas	99.3	5.9	5.6	10.9	-2.4	9.5
Utah	71.8	0.0	0.0	0.0	3.0	7.0
Vermont	86.8	0.0	0.0	0.0	0.0	9.0
Virginia	109.7	9.9	13.2	9.9	-4.3	8.8
Washington	90.1	0.0	1.2	0.0	-0.4	8.5
West Virginia	100.1	3.7	1.9	3.7	-3.3	9.3
Wisconsin	90.3	2.5	4.1	2.5	3.4	8.3
Wyoming	72.0	0.0	0.0	0.0	-0.9	7.5

[1] All figures are hospital weighted: that is, they are not weighted by admissions.

[2] The median is 34.0 RVUs per admission in 1991.

[3] For U.S. hospitals, 23.3% exceed 125% of the median, whereas only 22.8% would have been designated high cost (see Tables 1 and 2). The difference pertains to rural hospitals that are between 125% and 140% of the median. Note also that the mean relative growth rate necessarily equals zero only if the mean is weighted by admissions.

Table C-1

Regression of Volume per Admission, Including GME, 1992

Variable	OLS	2SLS
Bed Size	.118**	.117**
	(28.51)	(21.45)
I/R Ratio	.433**	.476**
	(18.34)	(7.51)
Disproportionate Share	.018	-.004
	(0.49)	(0.08)
Large Urban	.276**	.269**
	(32.29)	(31.15)
Other Urban	.188**	.182**
	(22.73)	(21.80)
Rural Referral Center	.118**	.098**
	(9.94)	(8.35)
Sole Community	-.019	-.020
	(1.24)	(1.29)
Intercept	2.863	2.871
R^2	.58	.57
F	987	946

The dependent variable is the log of casemix-adjusted RVUs (including RVUs associated with graduate medical education [GME]) per admission. The RVUs pertain to services delivered during the stay only.

N = 4901 for each regression.
** Significant at 99 percent confidence level.
Absolute t-values in parentheses.